

Riverfront land use and its further redevelopment

Adelina Fejza¹

Faculty of Architecture and Civil Engineering, Mother Teresa University, Skopje, North Macedonia,
adelina.fejza@unt.edu.mk

Sanja Avramoska²

Faculty of Architecture, Ss. Cyril and Methodius University, Skopje, North Macedonia,
avramoska.sanja@arh.ukim.edu.mk

ABSTRACT

The process of developing riverfront areas in urban settings carries a multitude of potential advantages, yet its success hinges upon a careful examination of environmental, social, and economic considerations. This paper addresses the need for adopting an analytical approach in the urban planning of riverfronts, emphasizing their pivotal role in fostering a sustainable city environment and shaping the city's overall image.

In doing so, this research delves into the evolving patterns of land use and redevelopment initiatives along riverfronts in two distinct cities: the River Vardar in the Aerodrom municipality of Skopje, North Macedonia, and the River Main in Offenbach, Germany. The criteria for choosing these case studies are one European Union (EU) city and one non-EU city, both sharing a comparable length of riverfront.

The research employs mapping techniques and observational methods, supported by photo documentation. These tools enable the identification of prevailing trends in riverfront land use. A comprehensive comparative analysis is then conducted between the two case studies, followed by recommendations for future redevelopment.

In essence, this analysis of selected urban riverfronts acknowledges its potential benefits while emphasizing the significance of a strategic and well-informed planning process. The findings and recommendations contribute not only to the specific contexts of the chosen cities but also offer broader insights applicable to urban areas seeking sustainable and appropriate riverfront land use transformations.

KEYWORDS

Riverfront redevelopment, land use, urban riverfronts, land use mapping

Introduction

The contested nature of riverfronts within urban landscapes faces multiple challenges and opportunities inherent in their development. As we engage in the task of shaping the layout of urban areas, particularly along waterfronts, it becomes crucial to consider the adaptability of these spaces. This involves a careful consideration of their capacity to accommodate alterations in the city's structure and the environment [1]. Simultaneously, it is important to maintain a sense of consistency in the urban fabric. Honoring and preserving the existing urban elements that contribute to the fundamental traits of a location is crucial. In essence, urban design should strike a delicate balance – being responsive to change while steadfastly preserving the unique characteristics that define the essence of a place [1].

Within the German urban context, there is a trend of reusing industrial brownfields as places where a new image of the city is being built. Offenbach am Main is a city in Hesse, Germany, that is a part of the Frankfurt urban area. In Offenbach, such example is the “Offenbach Harbour” redevelopment project which represents the transformative potential of repurposing industrial spaces. This project not only represents a departure from the traditional use of such

areas but also exemplifies a shift towards creating a residential and multifunctional urban living space [2].

On the other side, the use of the waterfronts in North Macedonia has been historically different, compared to the German context where there are harbors/former harbors. Vardar River is the longest river in North Macedonia, with a total length of 389km (301km in North Macedonia) [3], flowing through different cities and containing different riverfront development scenarios. The valley of the river holds significance for agricultural activities and serves as a crucial segment of the Morava-Vardar corridor [3]. The city of Skopje, situated along the river Vardar, has witnessed significant redevelopment initiatives, especially during the project “Skopje 2014” [4].

Researching these specific urban contexts of riverfront land use development aims to extract insights that extend beyond the confines of the chosen cities, contributing to a broader understanding of urban planning and design that seek to strike a harmonious balance between adaptability and the preservation of unique local identity.

Purpose of Study

The central objective of this research is to undertake a comprehensive comparative analysis of redevelopment patterns occurring along riverbanks in two contexts—one situated in an EU city and the other in a non-EU city. The overarching aim is to examine the nuances of redevelopment trends, particularly in terms of land use, within these urban landscapes. The methodology employed involves patched maps of land use, a visual representation that captures the existing scenarios in both selected cities and represents an analytical approach towards what are the current trends and differences, and possibilities of what can be redeveloped in the future.

The significance of this study extends beyond mere comparison, seeking to contribute valuable data and perspectives towards the potential development of riverbanks outside the EU to align with or even surpass EU standards. Through a detailed examination of existing trends and differences, the research aims to offer informed recommendations that can be instrumental in shaping the trajectory of future land use redevelopment initiatives. This is especially important for countries like North Macedonia which aspire to enter the EU and seek to see the gaps in their urban planning strategies. In essence, it serves as a catalyst for envisioning and implementing strategic urban planning measures that transcend geographical boundaries and contribute to the establishment of universally recognized standards for riverfront land use redevelopment.

Research Methods

In conducting this study, qualitative research methods were employed due to their capacity to offer a thorough exploration of the research objectives [5]. The selected research methodologies comprised mapping and on-site observation, involving photo documentation that capture the essence of two riverbanks. On-site observation was conducted directly, enabling a firsthand understanding of the physical context and complexities surrounding the riverfront areas.

For the specific focus of this research, a deliberate choice was made to study a segment of the River Vardar in the Aerodrom municipality in Skopje. This selection was based on the strategic similarity in riverfront zone length with the River Main in Offenbach, Germany. Additionally, the chosen segment in Skopje has a similar urban context to the German city, featuring a mix of residential areas, industrial zones, and expanses of greenery.

To enhance the precision and thoroughness of the analytical maps of land use within both Offenbach, Germany, and Aerodrom in Skopje, North Macedonia, an analysis of existing urban plans of land use was undertaken. In the case of Offenbach, Germany, particular attention was directed towards the examination of the "Masterplan Offenbach Am Main: 2030" brochure. Within this document, a focus was placed on the specifics outlined in the "RegFNP 2010" land use plan [6]. This approach involved rechecking the zoning information illustrated within the RegFNP 2010 document to ensure a thorough understanding and accurate representation of the current state of land use in Offenbach.

In the context of Aerodrom, Skopje, North Macedonia, the "General Urban Plan for the City of Skopje 2012-2022" was analyzed. Within this urban plan documentation, a more refined exploration concentrated on the "Land use plan – land use zones" [7]. The utilization of these precise sources aimed to ensure the accuracy and reliability of the analytical maps, providing a comprehensive foundation for understanding the spatial dynamics and urban development trajectories in Offenbach and Aerodrom.

The graphical part of the mapping process is completed by using various technological tools. This includes the utilization of platforms such as Google Maps for spatial visualization, Autocad for precise drafting, and Photoshop for graphic refinement. By incorporating these tools, the research ensured an accurate graphical representation of land use around the selected riverbanks, aligning closely with the physical landscape. In summary, the research methodology represents a combination of on-site observation, exploration of existing land use plans, and mapping.

Findings and Results

This research encompassed the systematic collection, comparison, and analysis of qualitative data to discern patterns and variations. Two riverbanks were examined, namely, the Aerodrom municipality in Skopje, North Macedonia, and Offenbach am Main in Germany. The initial step in our analytical research involved the creation of river typology maps, which are represented in Figure 1. These particular maps serve as a comparative tool, enabling us to assess the distinctive characteristics of two prominent rivers: the Vardar and the Main.

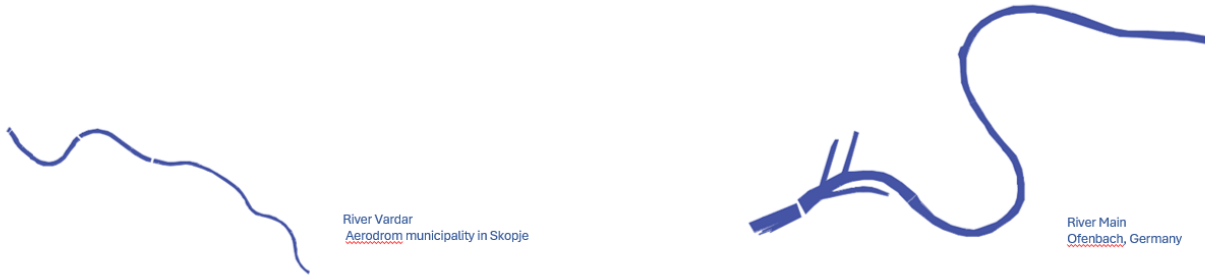


Figure 1: Analytical maps of river typology – comparison between River Vardar in Aerodrom municipality in Skopje, North Macedonia and River Main in Offenbach, Germany

It is evident that along the riverbank of Vardar there are no physical interventions such as expanding of the riverbed. On the contrary, the riverbank of the Main unfolds a transformation with some identifiable physical expansions. These expansions, once designated as harbors, have undergone a noteworthy alteration, now serving as integral components of mixed-use zones, such as the "Offenbach Harbour" residential project illustrated in Figure 4. The repurposing of these former harbor zones into mixed-use areas represents a good strategic urban development approach. This adaptive reuse not only enhances the historical significance of these locations but also offers the residents a distinctive experience near the river.

According to the analytical maps of land use, that were created for the selected case studies (Figure 2 and Figure 3); it was found that both locations have plenty of zones with greenery. However, a distinction emerged in the level of regulation and maintenance, particularly evident along the river Main in Offenbach. In this German context, the green spaces are more systematically organized and well-maintained, featuring designated areas for camping activities. Contrarily, the river Vardar in the Aerodrom municipality in Skopje presents a less regulated and maintained greenery landscape, with certain sections being visibly neglected and abandoned.

Along the river Main in Offenbach there is only one undeveloped industrial area (Figure 2), emphasizing a predominantly regulated and repurposed urban environment. In contrast, along the river Vardar in Skopje we can see bigger undeveloped zones (Figure 3). In both instances (Figure 2 and Figure 3), substantial industrial zones are situated in close proximity to the riverfronts, underlining the coexistence of industrial and residential land uses along these urban waterways. Areas designated for public buildings and administrative purposes dominate more in the Offenbach context.

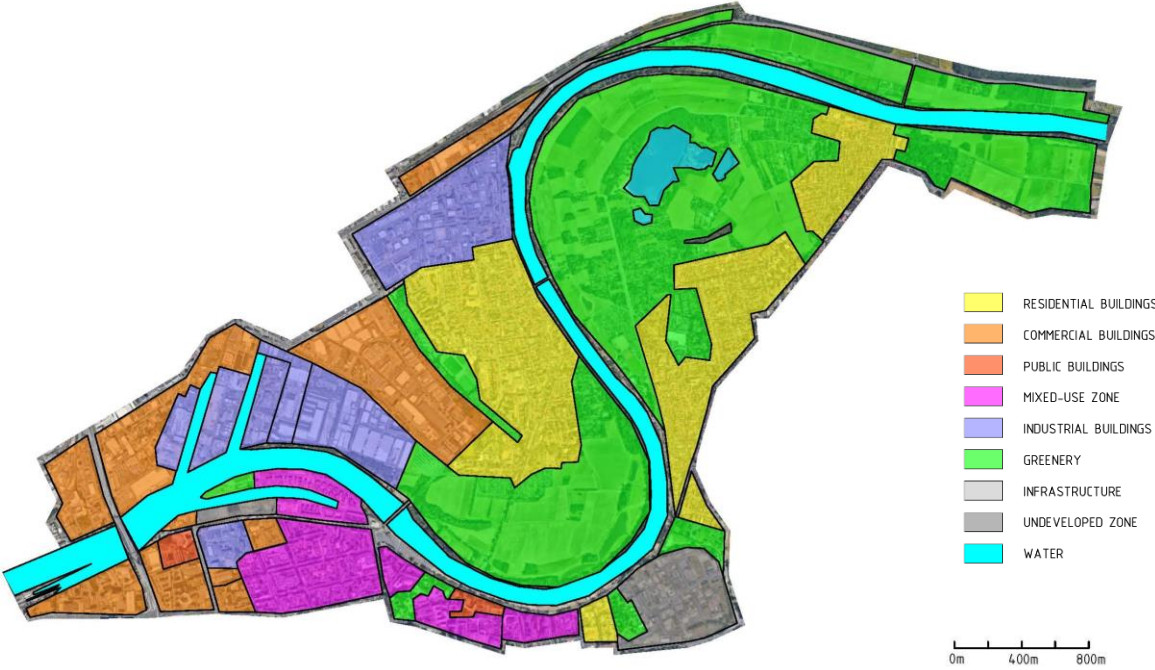


Figure 2: Analytical map of riverfront land use - River Main in Offenbach, Germany

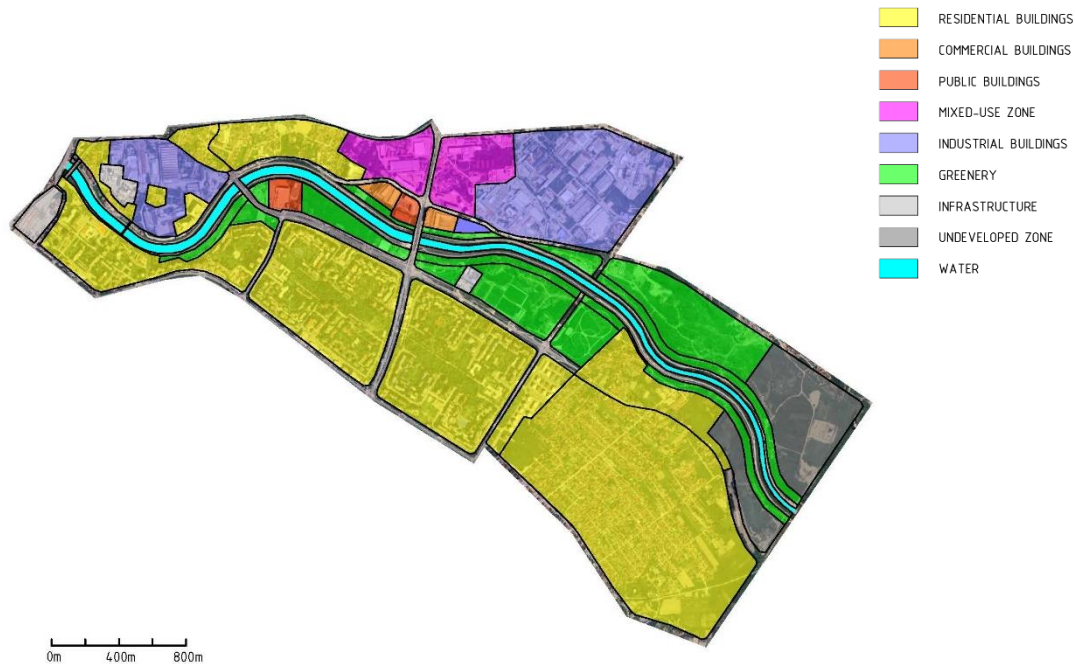


Figure 3: Analytical map of riverfront land use - River Vardar in Aerodrom municipality in Skopje, North Macedonia

When it comes to the buildings along the river Main in Offenbach, there is a tendency to build closer and near the river bank. Residential land use dominates with individual houses and new collective housing units (Figure 4). Whereas, in river Vardar in Aerodrom municipality in Skopje, the situation is the opposite. Most of the buildings are not adjusted so close to the riverbank. The Vardar riverbed also has more depth and a greater slope that prevents water overflow (Figure 5). This denivelation challenges the horizontal connection with the riverfront land use zones. What dominates in this case are the collective housing units built right after the big earthquake (1963), as shown in Figure 5, but in very few parts, there are some individual houses and some small areas with illegal buildings.

In Figure 4 and Figure 5, through on-site observation and photo documentation, we can see firstly the city silhouette in both case studies. This visual representation allows us to grasp the distinctive contours and spatial arrangement of the cities studied. Secondly, these figures capture the interrelation between residential areas and the adjacent river. These images shed light on how residential zones are connected with the watercourse, providing insights into the urban planning dynamics that shape the interaction between housing and the natural landscape. Thirdly, we can see the distinction between newly built (Figure 4) and old-built zones (Figure 5). Lastly, these images serve as a visual gauge for the level of maintenance observed in these areas. Examining the physical condition and orderliness of the urban landscape provides valuable indications of how well these regions are cared for and managed. In the case of Offenbach, the riverbank is treated like a public space which is designed with seating areas, observation points, platforms that provide direct contact with the river, several garbage points, and public toilets. Whereas, in the case of Vardar we can see only a continuous running track which is the main activity that is happening along the riverbank, and several seating benches located in the upper part of the riverbed.



Figure 4: River Main in Offenbach, Germany – “Offenbach Harbour” residential zone, source: Sanja Avramoska



Figure 5: River Vardar in Aerodrom municipality in Skopje, North Macedonia – residential zone, source: Adelina Fejza

Conclusions and Recommendations

This research provides valuable insights into the comparative analysis of riverfront redevelopment and land use between two distinct case studies, shedding light on the divergent trends and varying levels of development. The first analysis of the river typology reveals that in the case of Offenbach, the transformation of former harbors that was achieved through physical expansion of the riverbed and subsequent repurposing into mixed-use zones stands out as a successful and unique approach to land use. This prompts a reconsideration of the feasibility and desirability of future riverfront redevelopment to facilitate mixed land use. Also, it opens critical thinking about urban planning strategies, whether these physical expansions can occur intentionally, to provide better connection with the river and enhance land use diversity.

The second analytical land use maps provide a visually informative comparison between the two case studies, offering a clear representation of dominant riverfront land use. This analytical approach can help urban planners and architects, guiding them in rethinking the appropriateness of land use near riverfronts, identifying gaps, and formulating strategies for redevelopment. Based on the observed trends, we recommend mixed land use as a more compatible option near riverbanks, fostering a variety of scenarios along the river that contribute to a vibrant and dynamic urban environment.

The final analysis, which contains on-site observation and photo documentation, shows a contrast in the maintenance levels along the river Vardar in Aerodrom, Skopje, as compared to the river Main in Offenbach. The visibly lower maintenance along the Vardar prompts a call for action, emphasizing sustainable and compact urban riverfront planning, by adding more value to this kind of public space. Drawing from the exemplary practices and trends observed in the case of Germany which follows EU standards, it is recommended that North Macedonia should take proactive steps to emulate and integrate similar principles into their urban planning frameworks. This alignment with established standards can serve as an initial stride toward fostering sustainable and aesthetically pleasing riverfronts, ensuring the harmonious coexistence of urban development and natural landscapes.

ACKNOWLEDGMENTS

Sanja Avramoska acknowledges the financial assistance received from the Deutsche Bundesstiftung Umwelt. The field research was conducted as part of a research stay in Germany, supported by the MOE exchange scholarship.

REFERENCES

- [1] Jinhyun J. Toward Sustainable Urban Riverfront Redevelopment: Adaptability as a Design Strategy for the Hangang Riverfront in Seoul. *Sustainability*. 2023; 15(12). <https://doi.org/10.3390/su15129207>
- [2] DREISEITL consulting. *Offenbach Harbour*. <https://www.dreiseitlconsulting.com/offenbach-harbour> [Accessed 17th October 2023].
- [3] Britannica. *Skopje*. <https://www.britannica.com/place/Vardar-River> [Accessed 4th January 2024].
- [4] Deipenbrock E, Held M, Herbst Ch, Kaulen Ch, Kohler L, Pudimat M, et al. *Skopje – A Modern City?*. HafenCity Universität Hamburg; 2011.
- [5] Busetto L, Wick W and Gumbinger C. How to use and assess qualitative research methods. *Neurological Research and Practice* 2. 2020; 14. <https://doi.org/10.1186/s42466-020-00059-z>
- [6] AS&P. *Masterplan Offenbach Am Main: 2030*. Offenbach: City of Offenbach; 2015.
- [7] Republic of Macedonia Spatial Planning Agency. *General Urban Plan for the City of Skopje (2012-2022) Land use plan – land use zones*, 1:10000. Skopje: City of Skopje; 2012.